The Epidemiology and Health Burden of Diabetes Mellitus in Tertiary Hospital of Nepal.

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ABSTRACT

Diabetes Mellitus is the major public health problems in developing nations like Nepal. The objective of this study was to find out total number of Diabetes Mellitus cases in BPKIHS from 2012 to 2016 AD and to know the duration for which cases were admitted and improvement seen in them. This study was conducted in B. P. Koirala Institute of Health Sciences, Dharan, Nepal. The secondary data of Diabetes Mellitus was collected from the Medical Record Section of BPKIHS and analyzed. One thousand one hundred seventy six cases of Diabetes Mellitus were enrolled. Most of the cases were from Sunsari (43.1%), Morang (16%) and Jhapa (12.1%) District respectively. Most of the patients (74.7%) were admitted in Medicine wards. Almost 95.4% of admitted Diabetes Mellitus cases were improved in BPKIHS. The problem of Diabetes Mellitus is common and has become a key public health concern for all.

Introduction

Approximately 387 million people are living with diabetes worldwide with an estimated prevalence of 8.3% in 2014 and is predicted to increase to 10% by 2030 [1]. Diabetes caused 4.9 million deaths in 2014, costing 612 billion dollars in health care [1]. More than 80% of diabetes deaths are reported in low- and middle-income countries (LMICs) [2]. A systematic review carried out in 2012 confirmed a rapid increase in prevalence over the last two decades in the South Asian region [3].

Nepal is passing through a phase of epidemiological transition from a higher prevalence of communicable diseases to that of non-communicable diseases (NCDs) and is currently suffering from a double burden of diseases [4]. The prevalence of NCDs including diabetes is expected to increase rapidly in the near future [5]. There is a lack of reliable and representative data on the prevalence of diabetes in Nepal. Various small studies from different parts of the country carried out on the diverse populations have shown varying prevalence rates ranging from 6.3 to 8.5% [6,7].

It is anticipated that bringing together the currently available evidence of diabetes in Nepal will improve statistical power and provide more accurate estimations to inform policy makers at the local and national level to control the emerging burden of the disease. Thus, the purpose of this study is to find out total number of Diabetes Mellitus cases in BPKIHS from 2012 to 2016 AD and to know the duration for which cases were admitted and improvement seen in them.

Methodology

This was a hospital based retrospective study conducted from 26th June to 7th July 2017 to see the number of Diabetes Mellitus cases in B. P. Koirala Institute of Health Sciences, Dharan of Nepal. A total of one thousand one hundred seventy six cases between the ages of 2 to 92 years from 13/09/2012 to 12/09/2016 AD who were admitted to BPKIHS at different ward because of various clinical presentations.

It was study in which secondary data was collected from the Medical Record Section of BPKIHS.

Patients without complete medical records were excluded from this study. All the patients were recorded in as format age wise and sex wise. The variables were used in the study was age, gender, address, patients admitted in different wards with year, duration of stay in wards and their outcome etc. The written consent was taken from the Hospital Director of BPKIHS, Dharan.

The collected data was coded and entered in MS Excel 2007. The analysis was done by using statistical software SPSS (Statistical Package for Social Science) version 17. Percentage and proportion was calculated where ever applicable.

Results

Table 1. Distribution of study population by different sociodemographic characteristics.

Characteristics	Frequency	Percentage
Age in years		
Less than 15 years	66	5.6
16-40 Years	186	15.8
41-60 ears	475	40.4
>60	449	38.2
Sex		
Male	649	55.2
Female	527	44.8
Address		
Morang	188	16.0
Sunsari	507	43.1
Illam	29	2.5
Dhankuta,	40	3.4
Siraha	35	3.0
Jhapa	142	12.1
Others (Mahottari, Sarlahi, Terathum, Panchther, Dang, Sankhuwasava, India)	235	20.0
Total	1176	100.0

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A study subject consists of 1176 patients which were admitted in wards of BPKIHS from 2012 to 2016 AD. The study subjects consist of 55.2% of male and 44.8% of female. Most of Diabetic patients belongs from Sunsari, Morang and Jhapa District of Nepal. (Table 1 & 2)

Table 2. Distribution of study population by different variables

Characteristics	Frequency	Percentage
Patient admitted in a year		
2012	215	18.3
2013	211	17.9
2014	229	19.5
2015	210	17.9
2016	311	26.4
Admitted in different wards		
Pediatrics	69	5.9
Medicine	878	74.7
Surgery	191	16.2
Others (PICU, ICU, CCU)	38	3.2
Duration of stay in wards in days		
<5 days	693	58.9
6-10	335	28.5
11-15	83	7.1
≥16	65	5.5
Outcome		
Improved, cured	1122	95.4
Expired	9	0.8
Left against medical advice (LAMA)	42	3.6
Referral	3	0.3
Total	**1176**	**100.0**

Table 2 shows most of the patients (26.4%) admitted in 2016 AD. Most of the patients were admitted in Medicine ward. Almost 95.4% of admitted Diabetic cases were improved in BPKIHS.

Discussion

The global public health focus is gradually concentrating more on the non-communicable diseases (NCDs), owing to the progressively increasing trend in the burden of NCDs worldwide including the developing countries. Among these NCDs, the silent epidemic of diabetes currently has become one of the most worrisome public health concerns [8,9]. Diabetes Mellitus represents a tremendous issue of global concern. According to the International Federation of Diabetes, the prevalence of Diabetes Mellitus has already reached its epidemic level globally [10].

A study conducted by Gyawali B et al in Nepal which summarized prevalence of diabetes in Nepal for a 14-year period (2000-2014). Prevalence of diabetes ranged from a minimum of 1.4% to a maximum of 19.0% and pooled prevalence of diabetes was 8.4%. Prevalence of diabetes in urban and rural populations was 8.1% and 1.0%, respectively [11]. Few population-based studies conducted in Nepal so far have reported a high prevalence of diabetes in urban areas [12,13]. For instance, in a study by Singh et al. the prevalence of diabetes in an urban area of Nepal was 14.6% compared to 2.5% in a rural area [12]. There is an increasing urbanization in Nepal [14]. The general shift of people from rural to urban areas for education, employment, and a better life may have contributed to an increasing burden of diabetes. It is also possible that people with diabetes may move to urban areas after diagnosis to be closer to hospitals, perhaps staying with urban family members.

This increase could be attributed to various lifestyle changes associated with urbanization and deterioration of the ecological environment [15]. Linking to increase in obesity and reduction in physical activities in recent years in Nepal, the prevalence of pre-diabetes 10.3% observed in the study further highlights a potential indicator of further progression of the epidemic in the country unless preventive measures are introduced at a large scale [16].

Prevalence based on the most recent national surveys in neighbouring countries of Nepal that have similar culture and lifestyle profiles were 8.5% in India, 6.7% in Pakistan, and 8% in Sri Lanka according to International Diabetes Federation (IDF) estimates 2012 [17]. Wide range of prevalence rates obtained from a review by Siddiqui and colleagues, which showed prevalence rates of diabetes varying between 0.9 and 21.2% in Bangladesh and India, respectively [18]. A Mexican study reported a prevalence of diabetes ranging from around 3 to 20% [19]. Various socio-economic characteristics and lifestyle behaviours of rural and urban regions may have attributed to these observed differences between regions. The reported high prevalence of diabetes exemplifies the shift from a burden of disease ruled by mortality from infectious causes to chronic ones [20].

This study showed the age ranging from 2 to 92 years and it was more commonly seen in 41-60 years age group (40.4%) and more than 60 years age group (38.2%). The global diabetes prevalence in the age group 20-79 years were estimated to be 6.6% for the year 2010 which translates into 285 million people suffering from diabetes, according to international diabetes federation diabetes atlas [21]. Previous Thai National Health Examination Surveys (NHES) have shown that the prevalence of diabetes in individuals aged 20 years and over increased from 7.1% in 2004 to 7.5% in 2009 [22,23]. Regarding the distribution of diabetes we observed that prevalence increased with age, being highest among subjects aged >60 years (14.57%) which corroborated with the global scenario [8,24]. Similar findings were also reported from studies conducted in Kashmir [25], urban slums of northern India [26] and the National Urban Survey in six major Indian cities [27]. The reasons for increasing prevalence are not clearly evident but changes in lifestyle and physical inactivity can be an important contributor [28].

Current Study showed that there were more boys suffering from diabetes as compared to girls (55.2% vs 44.8%). The prevalence of diabetes is higher in men than women worldwide. The diabetes mellitus in urban population in developing countries is projected to double between 2000 and 2030 [29]. Prevalence was higher among males (7.74 vs 5.14) compared to females alike other studies in India [26,30] and abroad [31]. But a study conducted by Zaman FA et al in a south Indian rural population showed the prevalence of diabetes was more in women (22.04%) compare to men (16.06%) in Karnataka people [28]. In SEAR region, the highest prevalence of diabetes was in Bhutan (12% in males and 13% in females) and the lowest in Indonesia and Myanmar (6%-7% in both sexes) [32]. There is evidence that diabetes prevalence is differentially distributed by socioeconomic status (SES). The association between SES and prevalence of diabetes varies according to the level of national economic development. In developing countries, educational attainment as a proxy for SES has been positively associated with diabetes whereas this relationship was the opposite in developed countries. Furthermore, studies have demonstrated that this relationship is modified by sex [33,34].

In our study, we have observed that the disease occurs more in Sunsari district (43.1%) followed by Morang District (16%). A similar study conducted by Mehta et al also showed

higher prevalence of diabetes in people staying in Sunsari district, eastern Nepal [35]. According to the data of 'Sunsari Health Survey' of the year 1993, the prevalence of diabetes in Sunsari District, from eastern Nepal, was about 6% [36]. Mehta et al and Singh et al showed the prevalence of diabetes in urban area were higher in compare to the rural area [35,37]. Nepal is a developing country and people are changing their lifestyle like anything, they like to work by not doing hard work, this are making people physically inactive which is risk factor for development of obesity as well as diabetes. The prevalence of diabetes is increasing day by day in Nepal may be due to urbanization [35,37].

We have observed that the 95.4% of diabetes cases improved and only 0.8% was expired. About 1.1 million people were estimated to have died due to diabetes in 2005 and almost 80% of diabetes deaths occur in low- and middle-income countries and mostly people under the age of 70 years; 55% of diabetes deaths are in women [38]. The current national diabetes prevalence is 8.6% in India, with more than 1 million annual diabetes-related deaths in the 20 to 79 age group[9]. Thailand is among the countries in Asia with a high prevalence of diabetes [39]. More than 200,000 deaths annually among the Thai population are owing to chronic Non-communicable diseases, and about 30,000 deaths are owing to diabetes, a leading cause of death in Thailand [40]. About 9 million adults in 2014 from both developed and developing countries and across gender, as well as social class, were reported to be living with DM [41]. It accounted for about 1.5 million deaths globally in 2012 with more than 80% of the deaths believed to have occurred in low‐ and middle‐income countries [41].

Despite the amount of very useful statistics we were able to extract from this study, there did exist some limitations. First, it's a retrospective study, we were not able to review the details about patient's dietary habit, changes in lifestyle and physical inactivity. Second, information on different types of diabetes (type 1 or type 2) was not collected as they were not available. Third, the study did not take in to account the issues related to multiple hospital admissions or multiple diagnosis of a single patient.

Conclusion

The problem of Diabetes Mellitus is common and has become a key public health concern for all. The trend of Diabetes Mellitus cases did not consistently showed increasing or decreasing order in the past five years. Most of the cases were from Sunsari, Morang and Jhapa District out of cases reported in BPKIHS from eastern Nepal. Diabetes Mellitus has affected mostly more than 41 years of age groups and with male predilection. Around 95.4% of patients were improved and majority of them were discharged from medicine wards respectively.

Acknowledgment

References

1. International Diabetes Federation. Diabetes atlas sixth edition poster update 2014, Brussels, Belgium, 2014.
2. World Health Organization. Diabetes fact sheet. 2015. Available from: http://www.who.int/mediacentre/ factsheets/fs312/en/ (Cited 13 March 2018).
3. Jayawardena R, Ranasinghe P, Byrne N, Soares M, Katulanda P, Hills A. Prevalence and trends of the diabetes epidemic in South Asia: a systematic review and meta-analysis. BMC Public Health. 2012; 12: 380.
4. Neupane D, Kallestrup P. Non-communicable diseases in Nepal: challenges and opportunities. J Nepal Health Res Counc. 2013; 11: 225-228.
5. Vaidya A, Shakya S, Krettek A. Obesity prevalence in Nepal: public health challenges in a low-income nation during an alarming worldwide trend. Int J Environ Res Public Health. 2010; 7: 2726-2744.
6. Shakya-Vaidya S, Aryal UR, Upadhyay M, Krettek A. Do non-communicable diseases such as hypertension and diabetes associate with primary open-angle glaucoma, Insights from a case control study in Nepal. Global Health Action. 2013; 6: 226-36.
7. Sharma SK, Ghimire A, Radhakrishnan J, Thapa L, Shrestha NR, Paudel N. Prevalence of hypertension, obesity, diabetes, and metabolic syndrome in Nepal. Int J Hypertens. 2011; 2011: 821971. doi: 10.4061/2011/821971.
8. International Diabetic Federation, IDF Diabetes Atlas, 2013.
9. Regional Factsheets, IDF Diabetic Atlas, 2014.
10. Egede LE, Ellis C. Diabetes and depression: global perspectives. Diabetes Res Clin Pract. 2010; 87: 302-12.
11. Gyawali B, Sharma R, Neupane D, Mishra SR, Teijlingen EV, Kallestrup P. Prevalence of type 2 diabetes in Nepal: a systematic review and meta-analysis from 2000 to 2014. Glob Health Action. 2015; 8: 29088.
12. Singh DL, Bhattarai MD. High prevalence of diabetes and impaired fasting glycaemia in urban Nepal. Diabet Med. 2003; 20: 170-1.
13. Shrestha UK, Singh DL, Bhattarai MD. The prevalence of hypertension and diabetes defined by fasting and 2-h plasma glucose criteria in urban Nepal. Diabet Med. 2006; 23: 1130-5.
14. Nepal Demographics Profile. 2014. Available from: http://www.indexmundi.com/nepal/ demographics_profile. html. (Cited 18 March 2018).
15. Islam A, Tahir MZ. Health sector reform in South Asia: new challenges and constraints. Health Policy. 2002; 60: 151-69.
16. Vaidya A, Krettek A. Physical activity level and its sociodemographic correlates in a peri urban Nepalese population: a cross-sectional study from the Jhaukhel-Duwakot health demographic surveillance site. Int J Environ Res Public Health. 2014; 11: 39.
17. International Diabetes Federation. Country estimates table 2011. 2012. Available from: http://www.idf.org/sites/default/ files/EN_6E_Atlas_Full_0.pdf. (Cited 18 March 2018).
18. Kakar Z, Siddiqui M, Amin R. Prevalence and risk factors of diabetes in adult population of South Asia. Clin Med Diagn. 2013; 3: 18-28.
19. Castro-Sanchez H, Escobedo-de la Pena J. Prevalence of non-insulin dependent diabetes mellitus and associated risk factors in the Mazatec population of the State of Oaxaca, Mexico. Gac Med Mex. 1997; 133: 527-34.
20. Omran AR. The epidemiologic transition. A theory of the epidemiology of population change. Milbank Mem Fund Q. 1971; 49: 509-38.

21. Mehta RS, Karki P, Sharma SK. Risk factors, associated health problems, reasons for admission and knowledge profile of diabetes patients admitted in BPKIHS. Kathmandu Univ Med J. 2006; 4: 11-3.

22. Aekplakorn W, Abbott-Klafter J, Premgamone A. Prevalence and management of diabetes and associated risk factors by regions of Thailand. Third National Health Examination Survey, Diabetes Care. 2007; 30 (8): 2007–2012.

23. Aekplakorn W, Chariyalertsak S, Kessomboon P. Prevalence and management of diabetes and metabolic risk factors in Thai adults. The Thai National Health Examination Survey IV, Diabetes Care. 2011; 34 (9): 1980–1985.

24. Hjelm K, Atwine F. Health-care seeking behaviour among persons with diabetes in Uganda: an interview study. BMC Int Health Hum Rights. 2011; 11: 11.

25. Zargar AH, Khan AK, Masoodi SR, Laway BA, Wani AI. Prevalence of type 2 diabetes mellitus and impaired glucose tolerance in the Kashmir Valley of the Indian subcontinent. Diabetes Res Clin Pract. 2000; 47: 135-146.

26. Misra A, Pandey RM, Devi JR, Sharma R, Vikram NK. High prevalence of diabetes, obesity and dyslipidaemia in urban slum population in northern India. Int J Obes Relat Metab Disord. 2001; 25: 1722-1729.

27. Ramachandran A, Snehalatha C, Kapur A, Vijay V, Mohan V. High prevalence of diabetes and impaired glucose tolerance in India: National Urban Diabetes Survey. Diabetologia. 2001; 44: 1094-1101.

28. Zaman FA, Pal R, Zaman GS. Glucose indices, frank and undetected diabetes in relation to hypertension and anthropometry in a south Indian rural population. Indian Journal of Public Health. 2011; 55: 34-7.

29. Sarah Wild, MB BCHIR. Global prevalence of Diabetes. Diabetes Care. 2004; 27: 1047-53.

30. Gupta A, Gupta R, Sarna M, Rastogi S, Gupta VP. Prevalence of diabetes, impaired fasting glucose and insulin resistance syndrome in an urban Indian population. Diabetes Res Clin Pract. 2003; 61: 69-76.

31. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care. 2004; 27: 1047-1053.

32. World Health Organization: Noncommunicable diseases in the South-East Asia region: situation and response 2011. New Delhi: World Health Organization; 2011.

33. Tang M, Chen Y, Krewski D. Gender-related differences in the association between socioeconomic status and self-reported diabetes. International Journal of Epidemiology. 2003; 32 (3): 381–385.

34. Hwang J, Shon C. Relationship between socioeconomic status and type 2 diabetes: results from Korea National Health and Nutrition Examination Survey (KNHANES). 2010–2012. BMJ Open 2014; 4 (8): e005710.

35. Mehta KD, Karki P, Lamsal M. Hyperglycemia, glucose intolerance, hypertension and socioeconomic position in eastern Nepal. Southeast Asian J Trop Med Public Health. 2011; 42: 197-207.

36. BP Koirala Institute of Health Sciences: Sunsari health examination survey. Dharan: BP Koirala Institute of Health Sciences and National Health Education, Information and Communication Centre; 1996.

37. Singh DL, Bhattarai MD. High prevalence of diabetes and impaired fasting glycaemia in urban Nepal. Diabet Med. 2003; 20: 170-1.

38. Gabriel NS. The global pandemic of diabetes: an update. African health. 2009; 32: 50-4.

39. Nanditha A, Ma RCW, Ramachandran A. Diabetes in Asia and the Pacific: implications for the global epidemic. Diabetes Care. 2016; 39 (3): 472–485.

40. Porapakkham Y, Rao C, Pattaraarchachai J. Estimated causes of death in Thailand, 2005: implications for health policy. Population Health Metrics. 2010; 8 (1): 14.

41. Diabetes. World Health Organization, 2016. Available from: http://www.who.int/ mediacentre/factsheets/ fs312/en/. (Cited 18 March 2018).